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ABSTRACT

The implications of a life-span developmental prospective for Piagetian theory and research are discussed in this paper. Initially, certain recent criticisms of the Piagetian system are evaluated. These include the interpretations of Piaget's abstract model of logical reasoning; his views concerning the interrelationship of hereditary, maturational, and socioexperiential factors; the similarities and contrasts present in the Genevan viewpoint and neo-Hegelian dialectical approaches; and the possibility of continued developmental change following the adolescent years. A brief overview of the research on Piagetian concept development beyond the years of adolescence is presented. These cross-sectional assessment studies which have included samples of elderly subjects have generally found marked differences favoring the mature adult subsamples, similarities between the performances of the young children and aged subject subsamples, and/or apparent decrements in the performances of elderly persons on the Piagetian tasks. In a concluding section the philosophical, methodological, and practical implications of a straightforward acceptance of a life-span orientation are discussed. (TO)

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Theoretical Paper No. 46

LIFE-SPAN ANALYSES OF PIAGETIAN CONCEPT TASKS: THE SEARCH FOR NONTRIVIAL QUALITATIVE CHANGE

by

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Report from the Project on
Children's Learning and Development

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Statement of Focus

Individually Guided Education (IGE) is a new comprehensive system of elementary education. The following components of the IGE system are in varying stages of development and implementation: a new organization for instruction and related administrative arrangements; a model of instructional programing for the individual student; and curriculum components in prereading, reading, mathematics, motivation, and environmental education. The development of other curriculum components, of a system for managing instruction by computer, and of instructional strategies is needed to complete the system. Continuing programmatic research is required to provide a sound knowledge base for the components under development and for improved second generation components. Finally, systematic implementation is essential so that the products will function properly in the IGE schools.

The Center plans and carries out the research, development, and implementation components of its IGE program in this sequence: (1) identify the needs and delimit the component problem area; (2) assess the possible constraints—financial resources and availability of staff; (3) formulate general plans and specific procedures for solving the problems; (4) secure and allocate human and material resources to carry out the plans; (5) provide for effective communication among personnel and efficient management of activities and resources; and (6) evaluate the effectiveness of each activity and its contribution to the total program and correct any difficulties through feedback mechanisms and appropriate management techniques.

A self-renewing system of elementary education is projected in each participating elementary school, i.e., one which is less dependent on external sources for direction and is more responsive to the needs of the children attending each particular school. In the IGE schools, Center-developed and other curriculum products compatible with the Center's instructional programing model will lead to higher student achievement and self-direction in learning and in conduct and also to higher morale and job satisfaction among educational personnel. Each developmental product makes its unique contribution to IGE as it is implemented in the schools. The various research components add to the knowledge of Center practitioners, developers, and theorists.

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Abstract

The implications of a life-span developmental prospective for Piagetian theory and research are discussed. Initially, certain recent criticisms of the Piagetian system are evaluated, and these include the interpretation of Piaget's abstract model of logical reasoning; his views concerning the interrelationship of hereditary, maturational, and socioexperiential factors; the similarities and contrasts present in the Genevan viewpoint and neo-Hegelian dialectical approaches; and the possibility of continued developmental change following the adolescent years. It is maintained that most of these possible shortcomings are the result of incorrect secondary interpretations or misunderstandings of the Piagetian viewpoint as represented in Piaget's own writings.

A brief overview of the research on Piagetian concept development beyond the years of adolescence is presented. These cross-sectional assessment studies which have included samples of elderly subjects have generally found marked differences favoring the mature adult subsamples, similarities between the performances of the young children and aged subject subsamples, and/or apparent decrements in the performances of the elderly persons on the Piagetian tasks. The systematic incorporation of these findings into a life-span model of cognitive development has yet to be accomplished.

In a concluding section the philosophical, methodological, and practical implications of a straightforward acceptance of a life-span orientation are discussed. While the methodological concerns are extremely complex, they are, in principle, resolvable. More importantly, the acceptance of a life-span perspective demands a parallel adherence to a philosophical world view (i.e., the organismic) which expects multiple causation to be the rule and which places an emphasis upon the study of individuality.

Time present and time past
Are both perhaps present in time future,
And time future contained in time past.
T. S. Eliot

I
Introduction

No more sobering experience exists in academic life than to sit down to write a substantive essay under a presumptuous title submitted six months earlier in the glow of ambitious optimism. The eventual realization that a given topic is particularly complex and resistant to simplistic analysis may be genuinely beneficial to the writer, in the form of an increased sense of humility, but the reader is typically the disappointed loser. In the present instance, I must confess that I have not been able to make much significant progress toward a methodologically robust and conceptually satisfying view of nontrivial qualitative cognitive change across the life span. Nonetheless, I have a much better idea of what a true life-span orientation demands (in terms of the concomitant philosophical, conceptual-theoretical, methodological, and humanistic presuppositions) of the observer of human cognitive development, especially for the adherents of Piaget's system.

Initially, I will take this opportunity to respond to certain recent criticisms of Piagetian theory and related research which deny the utility of the Genevan views for a viable life-span approach in today's (and yesterday's and tomorrow's) ever-changing sociocultural milieu. I hope to demonstrate that only one of these putative weaknesses in the Piagetian system, i.e., the lack of a comprehensive acknowledgment of development beyond the adolescent years, is a genuine deficiency. Following this, I shall briefly discuss some of the issues raised by the complementary juxtaposition of an organismic viewpoint (e.g., Piaget's or Werner's developmental theories) with an interest in life-span cognitive development. It is my contention that a whole-hearted commitment to the latter subject area demands a collateral acceptance of the Piagetian type of developmental world view (cf. Hooper, 1973; Overton & Reese, 1973; Reese & Overton, 1970).

II
Piaget and His System Are Alive and Well—And Not Only in Geneva

While it is distinctly presumptuous of me to assume the role of defender of the "Piagetian Faith," I feel that certain recent critics of Piaget's theory have been singularly unfair and/or misinformed in their criticisms; thus I would like to make a few points on Piaget's behalf. The majority of these recent criticisms of Piaget's system discuss one or more of the following "deficiencies":

a. that Piaget's single-minded pursuit of the dominant characteristics and determinants of a structural approach to logical reasoning has culminated in a sterile automaton model of cognitive functioning devoid of concern for the individual person's needs, goals, and related idiosyncracies (e.g., Looft & Svoboda, 1973);

b. that in his views regarding the interactive pattern of hereditary, maturational, and socioexperiential factors Piaget has not sufficiently recognized the salient role of the latter component, especially in regard to changing historico-generational conditions (e.g., Looft, 1973; Riegel, 1973a, 1973b) or to the role of the individual as a potential source of change upon the surrounding environment (e.g., Riegel, 1973a, 1973c);

c. that Piaget's inordinate emphasis upon a biologically constrained "unfolding" of cognitive structure, relatively impervious to environmental variation, denotes genetic preprogramming (Beilin, 1971a) or, by implication at least, acceptance of a Kantian variety of apriorism (Riegel, 1973b) [points b and c are obviously closely related];

d. that the Piagetian system (particularly the equilibration processes), with all its reverence for an active constructionist view of man's cognitive growth, is not really "dynamic" enough in comparison to the neo-Hegelian dialectical approach of Rubinstein (cf. Payne [1968] as cited in Riegel [1973a, 1973c]; Wozniak [1973]);

e. that the interrelationships among the major Piagetian periods or stages of cognitive development and their respective behavioral archetypes (sensori-motor, concrete, and formal operational), especially following maturity, do not adequately characterize normal human functioning with its inherent blending of affective, motoric, iconic, and symbolic aspects--this criticism usually involves the stipulation of optional, multilevel operations (Riegel, 1973b; Werner & Kaplan, 1963) or claims that the progressive elaboration toward formal operational thought carries with it a systematic alienation of earlier modes of dealing with the "real" world (Riegel, 1973b), and related to this point;

f. that Piaget and his collaborators have paid insufficient attention to development during and beyond the years of cognitive "maturity," especially the aging years, and that consequently many interesting changes of both a progressive and regressive variety (perhaps of a genuine qualitative nature) have been ignored (e.g., Hooper, 1973; Hooper, Fitzgerald, & Papalia, 1971; Looft, 1972, 1973; Looft & Svoboda, 1973; Riegel, 1973a, 1973b, 1973c; Wozniak, 1973).

I believe the initial criticism concerns a natural outcome of the progressive elaboration and increased formalization which has charac-

terized the growth of Piaget's theorization attempts. The answer to "Where have all the people gone? [Looft & Svoboda, 1973, p. 15]" is quite straightforward--the individual cognizer is still there but he is now encapsulated in a highly abstract formal model of logical problem solving and associated ratiocination. As Van den Daele (1969) has recently pointed out, developmental stage theorists engage in a three-phase evolutionary process in "constructing" their theories. Brainerd (1973b) has discussed this three-step sequence in terms of general typologies. In the initial phase, mutually exclusive behavioral traits which clearly differentiate certain developmental levels are selected under logical and/or empirical criteria.

> During the second phase, the potential groupings are refined. Redundant traits and inconsistent traits are eliminated from the intensional complement of each stage . . . . During the final phase, the typology is translated into an abstract symbolism of some sort. Each stage is assigned a symbolic representation that facilitates description and explanation [Brainerd, 1973b, p. 7].

It is clear that Piaget's theorizing has "progressed" to the final abstract model stage. (Somehow it seems most appropriate to describe Piaget's scholarly endeavors themselves in stage terms.) In so doing, the original emphases (on unique individual persons with age-related particularistic thought processes, for example) are not lost; they are merely subsumed under the higher-order abstract mechanisms or constructs, e.g., the logical groupements which cover classificatory and relational concepts during the middle-childhood period. Of course, one could argue that Piaget has never paid enough attention to individual difference variables (unlike his American psychometric counterparts), but this is not a result of his recent model-building endeavors which stress the formal analogies between systems of logic and behavioral patterns (e.g., Piaget, 1970c, 1972a); rather, this stems from his bias toward behavioral uniformities and generalities (which we all know are the hallmark of any dedicated stage theorist).

The second criticism dealing with the supposedly minor role accorded to social or general experiential factors may be valid for secondary interpretations of Piagetian theory, but it clearly is not true of Piaget's own later writing. He has consistently (e.g., Inhelder & Piaget, 1964, pp. 293-294; Piaget, 1952b, pp. 18-20, 1962a, pp. 290-291, 1966, pp. 156-166, 1967, pp. 117-120, 1970a, pp. 721-722, 1970c, pp. 61-62; and Piaget & Inhelder, 1969, pp. 152-159) assigned a necessary (but not sufficient) "causative" role to socioexperiential determinants. Moreover, he distinguishes between logicomathematical, physical, and social experiences, all of which are essential to normative development (Piaget, 1970a, pp. 719-722; Piaget & Inhelder, 1969, pp. 155-156). For Piaget,

> maturation . . . is undoubtedly never independent of a certain functional exercise where experience plays a role . . . the maturation of the nervous system simply opens up a series of possibilities . . . without giving rise to an immediate actualization of these possibilities so long as the conditions of material experience or social interaction do not bring about this actualization. . . . This actualization presupposes certain conditions of physical experience such as the manipulation of objects, etc., which is also essential for logic, and certain social conditions such as the regulated exchange of information, mutual control, etc. [Piaget, 1967, pp. 119-120, emphasis added].

There are no possible grounds for misinterpretation here if one is willing to accept Piaget's defining criterion for accommodation--one conceptual part of the dynamic duo (the counterpart being assimilation, of course) which together make up the functional invariant of adaptation. The Piagetian organism does alter his cognitive makeup as a consequence of repeated encounters with his environmental surroundings.

In discussing the relationship of logical operations and social factors, Piaget has stated

> One (answer) is that without interchange of thought and co-operation with others the individual would never come to group his operations into a coherent whole: in this sense, therefore, operational grouping presupposes social life. But, on the other hand, actual interchanges of thought obey a law of equilibrium which again could only be an operational grouping, since to co-operate is also to co-ordinate operations. The grouping is therefore a form of equilibrium of inter-individual actions as well as of individual actions, and it thus regains its autonomy at the very core of social life [Piaget, 1966, pp. 163-164].

Piaget does deny that specific directed teaching is apt to produce genuine cognitive modifications (i.e., those changes which demonstrate long-term stability, increased operational and functional complexity, and which involve nonspecific transfer) (cf. Hooper, 1972, 1973; Piaget, 1964, 1970a, pp. 713-717) or should be the guiding focus of our educational endeavors (cf. Furth, 1970; Piaget, 1970b), at least insofar as the sensori-motor, pre-operational, and concrete operational child is concerned. Didactic approaches are appropriate for older individuals who have reached the formal operational level.

While it could be maintained that Piaget has neglected the outward directed results of operative thought, i.e., assimilation modifies environmental inputs but there is little formal treatment of the organism's influence on the surrounding milieu (cf. Riegel, 1973a, p. 15), the obvious implication of Piaget's comments upon the role of optimal educational programming (Piaget, 1964, 1970b, pp. 178-180) and the type of individual required in modern society shows a distinct concern for man as a creative innovator--thus as a source of potential change. Misunderstandings may arise over this issue because Piaget uses the equilibration process model both to describe the internal organizing factors which underlie sensori-motor schemes or higher-level representational schemata and their respective intercoordinations (Langer, 1969) and as a mediator of the macro-level interchanges between the active organism and the active environment (cf. Klausmeier & Hooper, in press).

Piaget's interest in long-term historico-generational changes in our past cultural heritage is evidenced in a number of instances (e.g., see Kaplan, 1971; Piaget, 1950, 1957 as reviewed in Flavell, 1963, pp. 255-261; Piaget, 1970c, pp. 97-119). His major concern with the historico-developmental approach to the analysis of particular knowledge forms certainly qualifies Piaget as one interested in long-term change.

> For a structuralism of this sort, structure and function, genesis and history, individual subject and society are--once the instruments of analysis have been refined--inseparable, the more so the more it perfects its analytic tools [Piaget, 1970c, p. 128].

Specialized assessment strategies designed to generate developmental norms nonconfounded by cohort or generational biases (cf. Baltes, 1968) are of little import, but methodological considerations such as these have never seemed to trouble the Genevan researchers. (They have always been much more preoccupied with what you do with your observational data than how you obtained it--provided, of course, that the integrity of the méthode clinique is not at issue.)

The assertion (point c above) that Piagetian theory implicitly accepts a form of Kantian apriorism is directly contrary to the explicit statements found in Piaget's writings (e.g., 1952b, pp. 376-395; 1966, pp. 14-17; 1970c, pp. 55-60). As is the case with Werner's theory (cf. Kaplan, 1967; Werner & Kaplan, 1963), the innate categories of reasoning are the focal topics for developmental analysis, but Kant's agenetic thesis is not accepted.

> Moreover, recourse to innate factors never resolves problems; it merely passes them on to biology, and as long as the fundamental question of acquired characteristics is not definitively resolved, it may always be supposed that modifications resulting from environmental influence will be found at the origin of an innate mechanism [Piaget, 1967, p. 117].

As the comments under point b imply, Piaget also denies that his theory necessarily requires ". . . that the mechanism by which thought processes develop is under the control of species-specific genetic programming . . . [Beilin, 1971a, p. 99]." The commonly observed systematic regularities (one is tempted to use the term "cultural universals") observed across markedly varied sociocultural settings for the concrete operational period concepts, for example, could also be determined by functionally uniform or ecologically equivalent life experiences (cf. Wohlwill, 1966, 1970). Piaget would probably assert that these cross-cultural consistencies follow from the fact that all significant cognitive growth is governed, in the final analysis, by the equilibration dynamics which all men share as biological entities.[1]

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[1] Piaget usually claims that sequences of logical concept acquisition rather than rates of acquisition (i.e., mean age of attainment) are the proper focus of inter- and intraindividual differences analyses insofar as sociocultural comparisons are concerned. The putative determinants of these invariant sequences could rest upon innate determinants or some variety of biological preformationism (Beilin, 1971a),

Point d is perhaps harder to deal with in the present brief (and sometimes cavalier) fashion, but it is refreshing in a way to speak to the contention that Piaget's conceptions are not dynamic enough.[2] In my reading of the Piagetian literature, I have always been impressed with the relativistic nature of the slowly evolving knowledge forms. The external world, the cognizing self, and of equal importance, the awareness of the self/world differentiation process could never be orthogonally defined without consideration of the interrelationships among these components. The description of this process, whether in terms of the organization-adaptation (assimilation and accommodation dyad) invariants or in terms of the equilibrium model, has always appeared to me as distinctly dialectical in nature. This formation-dissolution-reformation process includes within-period and across-period developmental phenomena. Moreover, the dialectical nature of the equilibration processes is highlighted by the dynamic aspects of these systems; they are never completely stable or balanced, but ever-changing throughout life. As Wozniak (1973) has recently stated:

> Piaget employs the term "reflective abstraction" to denote the process in which an operation which organizes one level of application is rediscovered at a second more general level and in organizing this new level serves to enrich and integrate the previous level combining it with new elements. Thus a continuity and coherence is maintained in development while simultaneously allowing for the production of novelty. Furthermore, such structures define only relative periods of constancy and identity in the child's psychological functioning tending toward a state of equilibrium. A Piagetian "stage," for example, which is a macrostructure, is a period of relative and not absolute stability, i.e., it represents stable structures only when viewed at the macro level, as a totality. When taken in terms of its constituent sub-structures, existing at lower levels, macro-stability is no longer manifest. The child's intelligence never stops developing but certain structures at certain levels at certain points in time achieve relative stability [Wozniak, 1973, pp. 10-11].

Other writers (e.g., Elkind, 1967, pp. xii-xiii; Overton & Reese, 1973, pp. 77-82; Reese & Overton, 1970, p. 135; Hamlyn, 1971, p. 15; Riegel, 1973b, pp. 8-9) have noted the close affinity of Piaget's views to a dialectical position. As will be shown below, certain writers (e.g., Looft, Riegel, and Wozniak)[3]

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environmentally derived recurrent regularities (Wohlwill, 1970), or upon logically constrained inter-item relationships (cf. Flavell, 1972; Kaplan, 1971).

[2]It is interesting that, in comparison to the operational looseness of Piaget's system, a wholehearted philosophical acceptance of the neo-Hegelian dialectical position may result in a methodologically indefensible state of affairs (Overton & Reese, 1973). Riegel's dualistic dialectic (soma/psyche and self/external world) in which all components are rapidly changing over cultural and ontogenetic time presents a formidable task indeed for those of us concerned with eventual operational specification. A single bipolar interacting entity is hard enough to specify and "anchor" without qualifying the values of each polar aspect vis-à-vis another dialectical system's perturbations and regulations. The operational complexities inherent in a truly representative dualistic dialectical design strain the imagination.

[3]In fairness to Riegel, it should be pointed out that he has directed his criticisms of Piagetian theory to that writing typified by such works as The Psychology of Intelligence (1966) and The Origins of Intelligence in Children (1952b). Thus, the earlier phase of Piaget's research and the most recent writings, represented by the overview volume, Structuralism, would not appear to be at issue (see Riegel, 1973b, footnote 4, pp. 35-36). However, in fairness to Piaget, it does not seem completely equitable to ignore his more recent writings (i.e., Piaget, 1970a, 1970b, 1970c) when building a case for conceptual inadequacies. As mentioned earlier, other critics (Looft & Svoboda, 1973) have attacked the recent Piagetian formulations as contrasted with "vintage" Piaget. Piaget's theory must be considered as an organic entity which itself has undergone change over time. I certainly concur with Riegel and with Looft in urging that a genetic analysis of Piaget's evolving theoretical views would be a genuinely worthwhile undertaking (cf. Looft & Svoboda, 1973, pp. 11-12; Riegel, 1973b, p. 35; 1973c, pp. 30-31).

apparently feel that the dialectical process aspects of Piaget's system are "lost" during the adulthood and aging years. Piaget's recent views belie these misgivings. For example, he concludes as follows:

> Just as the structuralism of the Bourbaki has already expanded into a movement calling for more dynamic structures (the categories with their functional emphasis), so the other current forms of structuralism are no doubt big with future developments. And since an immanent dialectic is here at work, we can be sure that the denials, devaluations, and restrictions with which certain structuralists today meet positions which they regard as incompatible with their own will one day be recognized to mark those crucial points where new syntheses overtake antitheses [Piaget, 1970c, p. 143, emphases added].

One of the possible distinctions between the views and emphases of Piaget compared to Werner (as representative spokesman for the organismic world view)[4] concerns cognitive functioning following maturity (points e and f above). Piaget is, of course, primarily a cognitive theorist--moreover, by choice, one rather exclusively concerned with logical reasoning and related problem solving. He thus pays little attention to imagination, reverie, dream states, creative expression in nonabstract media, or to many aspects of affective functioning (more exactly--he doesn't ignore them [see Piaget, 1962b]; he simply subordinates these phenomena to logical thought processes or views cognition/affect patterns as indissociably fused, cf. Flavell, 1963, pp. 78-82). Werner's views, in contrast, are much more global and all-encompassing concerning the variety of human behaviors which undergo genuine developmental transformation (Kaplan, 1967; Langer, 1969, 1970). In addition, a wider range of information sources dealing with comparative analyses, e.g., cross-species, cross-cultural, cross-generational, normal/pathogenetic, and micro-genetic, in addition to the focal ontogenetic changes are explicitly admissable as developmental data in Werner's approach. Most importantly for our present concerns, Werner at least discusses the possibility of bidirectional developmental change (Roberton, 1972), raising the possibility of short-term functional regression under special conditions during the mature years and general dedifferentiation and decreased hierarchic integration during the aging years.

A case could be argued therefore that Werner's position is a more veridical reflection of normal adult life (and a more sympathetic one for those of us who find it difficult to function at the formal operational level for extended time periods). Still, both Piaget and Werner would strongly disagree with the contention that the acquisition of formal operational thought or symbolic reasoning denies the continued utilization of earlier knowledge forms based upon motoric or iconic modes. They certainly would deny that the acquisition of higher (from their vantage point) thought processes removes the individual from contact with the real world and results in a perverse form of cognitive alienation from concrete reality (Riegel, 1973b; Wozniak, 1973).

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[4] It has always seemed curious to me that so much of the credit (and corollary responsibility for any shortcomings) for the "establishment" of genetic epistemology on sound theoretical and empirical grounds should be rather exclusively accorded to Jean Piaget. Piaget's views (as he has indicated, i.e., Piaget, 1950, 1952a) have a number of precursory sources which include Wundt, Binet, Baldwin, and Claparède to name only a few (cf. Kaplan, 1971, p. 63). While this may reflect the vagaries of the Zeitgeist, it is particularly surprising (and sometimes a source of consternation) to me that certain contemporaries of Piaget such as Cassirer and Werner (who certainly can make equally viable claims to the title "genetic epistemologist") are seldom mentioned (and, I surmise, seldom even read) by American psychologists. The lack of acceptance of Werner's developmental views is discussed by Brainerd (1973b, pp. 15-18), Langer (1970, p. 772), and White (1970, pp. 662-665), while Kaplan seldom misses an opportunity to defend justifiably the Wernerian viewpoint. Some writers, e.g., Hooper (1973) and Langer (1969), stress the similarities found in Werner's and Piaget's viewpoints, while others (such as Flavell or Kaplan or Overton) are, perhaps, more circumspect in describing the unique, yet complementary, contributions of the foremost organismic theorists. In the present context, Werner's developmental theory appears ideally suited for life-span applications.

It must be remembered that Werner's levels and Piaget's stages of cognitive development are, first and foremost, hierarchically organized systems in which the earlier (lower?) forms of dominant functioning are superseded by the subsequent forms, but are never lost (Langer, 1970; Piaget, 1970; Werner & Kaplan, 1963). Thus the motoric and perceptual aspects may be functionally subordinate to the more abstract contemplative modes of "knowing" our world, but they continue to operate and to undergo further development and specialization. In a normal individual, all forms or modes of contact with the surrounding environment exist in an organized system. Moreover, the various modes of knowing our world, of organizing our daily activities, and of mediating our intercourse with other persons are commingled in the distinctly human activities of art, mythology, language, warfare, unrequited love, etc. What mode is dominant at any given point in time depends upon the affective/conative context; the same symbol may denote markedly different meanings depending upon the shared context as the studies of word magic (Cassirer, 1946; S. K. Langer, 1951) have shown.

Now it is quite true that Piaget and Werner rank order the degree of absolute development or relative complexity of motoric, perceptual, and symbolic-representational (formal operational period for Piaget) levels, reserving the highest position to the latter contemplative-abstract level. But man as a symbol maker and user does not lose contact with reality as a consequence of this developmental process (although some would argue that neuroses are one uniquely human outcome). Rather, he acquires the ability to transform and transcend concrete reality if he so chooses. As Cassirer has made clear, reflective or contemplative abstractions, especially with regard to language forms, are the ultimate links between men as social organisms and the world about them--thus permitting a view of reality never possible through enactive or iconic modes alone.

> It was a long evolutionary course which the human mind had to traverse, to pass from the belief in a physico-magical power comprised in the Word to a realization of its spiritual power. Indeed, it is the Word, it is language, that really reveals to man that world which is closer to him than any world of natural objects and touches his weal and woe more directly than physical nature. For it is language that makes his existence in a community possible; and only in society, in relation to a "Thee," can his subjectivity assert itself as a "Me." But here again the creative act, while it is in progress, is not recognized as such; all the energy of that spiritual achievement is projected into the result of it, and seems bound up in that object from which it seems to emanate as by reflection. Here, too, as in the case of tools and instruments, all spontaneity is felt as receptivity, all creativity as being, and every product of subjectivity as so much substantiality. And yet, this very hypostatization of the Word is of crucial importance in the development of human mentality. For it is the first form in which the spiritual power inherent in language can be apprehended at all; the Word has to be conceived in the mythic mode, as a substantive being and power, before it can be comprehended as an ideal instrument, an organon of the mind, and as a fundamental function in the construction and development of spiritual reality [Cassirer, 1946, pp. 61-62].

Finally, contrary to the contentions of Wozniak (1973, p. 16),[5] it is indeed the abstract contemplative mode of cognitive functioning, as exemplified in Piaget's formal level hypothetico-deductive reasoning, which permits men to "construct" theories like Piaget's and, not incidentally, to engage in academic discourse concerning the correct interpretation of these theories once conceived (cf. Kaplan, 1967, p. 81).

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[5] From the organismic viewpoint it is futile to engage in polemic discussion concerning antecedent-consequent analysis of developmental outcomes as conceptually distinct from a description and analysis of the final product at issue (formal causation). One can no more determine the particularistic form and contents of Piaget's final theory from an exhaustive cataloging of his past history than one can expect to unravel the formative progression (development) of his theory from an exhaustive (logical or phenomenological) analysis of the properties of his formal model of cognition. Attempts to do so confuse efficient, formal, and final causative determinants (cf. Kaplan, 1967, p. 71; Overton & Reese, 1973, pp. 75-77).

"You are old, Father William," the young man said,
"And your hair has become very white;
And yet you incessantly stand on your head--
Do you think, at your age, it is right?"

"In my youth," Father William replied to his son,
"I feared it might injure the brain;
But now I'm perfectly sure I have none,
Why, I do it again and again."

Lewis Carroll

III
Cognitive Development Beyond the Adolescent Years

I imagine everyone feels very strongly that some very important cognitive advancements are indeed accomplished following the flowering of adolescence. In this regard, Piagetian theory is not very informative (Hooper, Fitzgerald, & Papalia, 1971; Looft & Svoboda, 1973; Riegel, 1973b). What little that has been written from the Genevan viewpoint concerning possible changes during the adult and aging years (Flavell, 1970; Piaget, 1972b; Smedslund, 1963) has emphasized experientially based (e.g., occupational status, years of formal schooling) specialization and diversification of an essentially nonqualitative nature. In contrast, Riegel (1973b) has proposed a fifth stage of cognitive development characterized by "dialectical operations" and denoting qualitative progression during adulthood.

What empirical findings are available concerning the possible changes following adolescence may be briefly summarized. Initially, it must be acknowledged that we really know very little about the typical cognitive competencies of normal adults as they are confronted with Piagetian concept tasks. A few studies have shown that criterial formal operations performances appear later than Piaget originally contended, and in some instances, have been notably absent in mature subjects (e.g., Elkind, 1962; Piaget, 1972b; Smedslund, 1963; Stephens, 1972; see also the review of animistic tendencies in adults by Looft & Bartz, 1969, pp. 13-14). This has led Smedslund to conclude as follows:

> The present data lead to the following interpretation of the Piaget-Inhelder theory: The analyses in this theory are seen as referring to the optimal performance at each developmental stage. Thus, a child capable of concrete reasoning in some situations may be functioning at a prelogical level in others, but will never reason at a formal level. An adult who is able to apply correlational reasoning in a highly simplified situation may regress to a particularistic or to an absolute frequency approach in many everyday life situations. Briefly, it is assumed that the developmental stages are descriptive of different levels of cognitive functioning, and that adults may, at various times, function at any of these levels, although under optimal conditions they are capable of formal, hypothetico-deductive reasoning. The empirical problem in each case is to determine under what range of conditions a given person will function at a given level. The present data support the hypothesis that this range is very restricted, or even non-existent, in most adults as far as the concept of correlation is concerned [Smedslund, 1963, p. 173].

There are a somewhat larger number of studies that have administered Piagetian tasks to aged subjects (and in some cases compared these normative patterns to those of younger subjects). These include:

a. research with clinical populations of elderly subjects
   1. Ajuriaguerra, Boehme, Richard, Sinclair, and Tissot (1967) (time concepts and representative concrete operational tasks [linear and inverse order, horizontal coordinates, typological representation, conservation of quantity, weight, and volume] in 15 subjects aged 64 to 86 years and a comparison sample of 6 noninstitutionalized subjects aged 74 to 90 years)

2. Ajuriaguerra, Kluser, Velghe, and Tissot (1965) (object permanence tasks and sensorimotor tasks assessing "operational schemata" similar to the vocal encoding subtest of the Illinois Test of Psycholinguistic Abilities in 19 subjects aged 67 to 91 years)
3. Ajuriaguerra, Richard, Rodriguez, and Tissot (1966) (spatial orientation and representation tasks [ideo-motor apraxia] in 13 subjects 64 to 86 years of age)
4. Eisner (1973) (conservation of surface area, number, continuous quantity [clay and water] and weight, discontinuous quantity, and volume in ten males free from organic brain damage [65-83 years of age, $\bar{X}$ age = 71.7 years], ten institutionalized males diagnosed as evidencing moderate chronic organic brain syndrome [64-91 years of age, $\bar{X}$ age = 74.4 years], and ten severely brain-damaged institutionalized males [78-90 years of age, $\bar{X}$ age = 84.0 years]);

b. studies of normal nonclinical samples of elderly persons
1. Dennis and Mallinger (1949) (animistic reasoning in subjects 70 years of age and older)
2. Papalia, Kennedy, and Sheehan (1973) (conservation of surface area in 48 subjects aged 63 to 92 years)
3. Papalia, Salverson, and True (1973) (quantity, weight, and volume conservation tasks in 48 subjects aged 64 to 85 years)
4. Rubin (1973) (spatial egocentrism and conservation of two-dimensional space, number, continuous quantity [clay and water] and weight in a sample of 28 institutionalized subjects aged 71 to 85 years and a sample of 27 noninstitutionalized subjects 70 to 85 years of age
5. Storck, Looft, and Hooper (1972) (multiplicative classification and seriation, conservation of weight and volume, and a role playing egocentrism task in a sample of 24 subjects aged 55 to 79 years);

c. studies which compared the performances of elderly persons and younger age groups
1. Annett (1959) (classificatory sorting tasks in 303 children aged 5 to 11 years and 42 adults aged 18 to 73 years)
2. Denny and Lennon (1972) (classificatory sorting tasks in 32 middle-aged adults 22 to 55 years of age and 32 elderly adults 67 to 95 years of age)
3. Kominski and Coppinger (1968) (conservation of surface area in 102 institutionalized male veterans in three age groups: 50-59, 60-69, and 70 years of age and older)
4. Looft and Charles (1971) (spatial egocentrism and social communication-interaction tasks in 46 young adults [$\bar{X}$ age = 19 years, none over 21 years] and 34 aged persons [$\bar{X}$ age = 77 years, none under 66 years])
5. Overton and Clayton (1972) (transitive inference [length] and formal reasoning [pendulum task] in 20 college-aged females [$\bar{X}$ age = 19.05 years], 20 females aged 60 to 69 years [$\bar{X}$ age = 64.90 years], 20 females aged 70 to 79 years [$\bar{X}$ age = 73.25 years], and 20 females aged 70 to 79 years [$\bar{X}$ age = 76.35 years] from a home for the aged)
6. Papalia (1972) (conservation of quantity, number, weight, and volume in 96 subjects across the age range of 6 to 7 years, 11 to 13 years, 18 to 19 years, 30 to 54 years, 55 to 64 years, and over 65 years of age)
7. Rubin (1974) (spatial and communicative egocentrism measures in four groups: young [15 males and 15 females, $\bar{X}$ age = 7.63 years], late childhood [15 males and 14 females, $\bar{X}$ age = 11.53 years], young adult [11 males and 14 females, $\bar{X}$ age = 21.07 years], and elderly [13 males and 14 females, $\bar{X}$ age = 76.33 years],
8. Rubin, Attewell, Tierney, and Tumolo (1973) (spatial egocentrism and conservation of two-dimensional space, number, continuous quantity [clay and water] and weight in 132 subjects in five differing age groups, i.e., young [$\bar{X}$ age = 7.63 years], late childhood [$\bar{X}$ age = 11.53 years], young adult [$\bar{X}$ age = 21.07 years] and elderly [$\bar{X}$ age = 76.33 years])
9. Sanders, Laurendeau, and Bergeron (1966) (conservation of surface area in 155 subjects in three groups; 20 to 39, 49 to 59, and 60 years of age and older)[6]; and

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[6] In addition to these completed age comparative studies, a series of life-span investigations (cross-sectional and short-term

d. studies of disparate age groups or the elderly which assessed performance on theoretically relevant non-Piagetian task formats, for example,
   1. Bromley (1956, 1957, 1970)
   2. Comalli, Wapner, and Werner (1959)
   3. Riegel and Riegel (1964)
   4. Trembley and O'Connor (1966)
   5. Wapner, Werner, and Comalli (1960).

In almost every instance, these cross-sectional assessment studies have found marked differences favoring the mature adults, similarities between performances of the young children and aged subjects subsamples, and/or apparent decrements in the performances of the elderly persons on the Piagetian tasks. It is particularly interesting that in the elderly subject samples, the relative item difficulties for the formal/concrete task comparisons and the concrete operations inter-task analyses, i.e., the well-known horizontal décalages and the within-stage item concurrences or correspondences, parallel those found for samples of younger subjects aged 5 to 15 years. This has led to the intriguing speculation that longitudinal assessments could detect a regression sequence in reverse order to that associated with the child's normative acquisition sequence (cf. Ajuriaguerra, Boehme, Richard, Sinclair, & Tissot, 1967, pp. 388-389 and 436-437; Ajuriaguerra, Kluser, Velghe, & Tissot, 1965, pp. 316-318 Ajuriaguerra, Richard, Rodriguez, & Tissot, 1966, pp. 460-461 [sensori-motor period tasks]; Ajuriaguerra & Tissot, 1966, pp. 335-336; Hooper, Fitzgerald, & Papalia, 1971, pp. 15-16; Papalia, 1972, p. 231; Papalia, Salverson, & True, 1973, pp. 5-8; Storck, Looft, & Hooper, 1972, p. 464 [concrete operations period tasks]). The available evidence has been so consistently uniform that investigators are beginnning to speculate regarding the possible correlates of impaired functioning on the Piagetian task settings, e.g., the effects of institutionalization (Ajuriaguerra, Boehme, Richard, Sinclair, & Tissot, 1967; and Rubin, 1973; contrasted with Overton & Clayton, 1972) and related social interaction factors (Denny, 1973; Looft, 1972; Looft & Charles, 1971), the role of educational attainment (Papalia, 1972; Sanders, Laurendau, & Bergeron, 1966; and Storck, Looft, & Hooper, 1972; contrasted with Papalia, Kennedy, & Sheehan, 1973; and Papalia, Salverson, & True, 1973), and the possible relationship of Piagetian concept competencies to the psychometrically derived distinctions between fluid and crystallized general intelligence (Horn, 1970), e.g., Hooper, Fitzgerald, and Papalia (1971), Hooper and Storck (1972), Overton and Clayton (1972), Storck, Looft, and Hooper (1972).

The fundamental questions at issue here concern: (a) Whether the performances of normal adults from a representative sampling of sociocultural and occupational groups on formal reasoning tasks merit the use of a stage designation to the same extent (i.e., in terms of cultural universalism and relatively minor interindividual and intraindividual variability) as that accorded to the earlier developmental stages; and assuming the answer to the initial question is affirmative, (b) Whether the performance difficulties of the elderly subjects on formal, concrete, and sensori-motor tasks denote competence deficits (Flavell & Wohlwill, 1969) and hence merit the appellation of qualitative regression.

In regard to the first issue, Piaget has recently commented regarding the status of formal operations period research:

> But there is the possibility of a third hypothesis and, in the present state of knowledge, this last interpretation seems most probable. It allows us to reconcile the concept of stages with the idea of progressively differentiating aptitudes. In brief, our third hypothesis would state that all normal subjects attain the stage of formal operations or structuring if not between 11-12 to 14-15 years, in any case between 15 and 20 years. However, they reach this stage in different areas according to their aptitudes and their professional specializations (advanced studies or different types of apprenticeship for the various trades): the way in which these formal structures are used, however, is not necessarily the same in all cases [Piaget, 1972b, pp. 9-10].

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longitudinal assessments) are currently under way at the University of Wisconsin, Madison, under the direction of Diane Papalia, Nancy Sheehan, Patricia Storck, and the author. Topic areas include animistic reasoning, concrete and formal operational reasoning tasks, moral development, egocentrism tasks, and representative measures of fluid and crystallized intelligence. Additional Piagetian life-span comparative studies are being conducted by Nancy W. Denny at the University of Kansas and Kenneth Rubin at the University of Waterloo, Canada.

Insofar as the second question is concerned, while it is indeed true that the Genevan researchers have conducted some extremely interesting assessments on elderly persons, they have not, as yet, systematically incorporated these findings into a life-span model of cognitive development.

> The original aim of developmental theory, directed toward the study of universal genetic changes, is still one of its main concerns; but side by side with this concern, the conviction has been growing in recent years that developmental conceptualization, in order to reaffirm its truly organismic character, has to expand its orbit of interest to include as a central problem the study of individuality.
>
> Heinz Werner

IV
The Relationship of Organismic Theory and Life-Span Developmental Research

As recently as 1963, Nancy Bayley felt obligated to make a special plea for the necessity of the life-span approach to developmental analysis:

> This train of thought leads to the necessity, for a comprehensive approach to the study of behavior, that we consider the whole life-process as a frame of reference. . . . In general, change is most rapid and most obvious at the two ends of the lifespan, in infancy-childhood and in old-age senility. However, even though it tends to be forgotten, and even though the various behavioral functions of the young adult are often treated as stable, change is continuous, right through the "mature" adult period. The process of maturation of growth and subsequent decline never cease, whatever the structure or function being considered [Bayley, 1963, p. 126, emphases added].

Today I think it is fairly safe to say that a general life-span orientation has been accepted by a large number of developmental investigators (cf. Baltes, 1973). I should like to ask, How many of these enthusiastic promoters of a life-span Zeitgeist realize exactly what they are getting themselves into? If one accepts the provisional definition "Human life-span developmental psychology is concerned with the description and explication of ontogenetic (age-related) behavioral change from birth to death [Baltes & Goulet, 1970, p. 12]," and if one wishes to add potential modification as a long-range objective (Baltes, 1973), then we do indeed have a formidable task ahead of us. This follows as a natural consequence of the fact that all of the conceptual and methodological problems germane to an age-specific developmental analysis, e.g., infancy or the aging years, are the natural preoccupation of a true life-span developmentalist. Now, even if you restrict your attention to a single relatively circumscribed behavioral domain (and most life-span researchers are too zealously "holistic" to do this), the resultant assessment-interpretation task is enormously complex. Initially, when I contemplate the considerable controversy and disagreement among researchers in a relatively restricted content domain/age range, e.g., cognitive development during the years of middle childhood--the topic area with which I am most familiar--I must confess the prospects for a viable life-span research program are dismally pessimistic.

Most of this initial pessimism concerns the considerable methodological problems associated with life-span assessments (cf. Nesselroade & Reese, 1973). These usually involve three interrelated prerequisities: (a) the provision of an array of task or measurement settings demonstrating equivalent reliability and validity (of a psychometric and ecological variety); (b) the provision of general assessment designs (normative measurement and experimental manipulation) which permit unbiased estimates of developmental changes; and (c) the provision of statistical analysis procedures which can accommodate multiple independent and multiple dependent variables. Assuming consensual operational agreement regarding the target cognitive behaviors, an explicit answer to a quest for specifying nontrivial qualitative change probably awaits the provision of these methodological essentials.

However, before we lapse into premature despair, I should like to point out that all problems of life-span psychology which are distinctly methodological in nature are in principle ultimately resolvable. In essence, the methodological and general research design

requirements of life-span ontogenetic assessment are analogous to those in any area of comparative analysis (e.g., phylogenetic, pathogenetic, or ethnogenetic comparisons). It follows, therefore, that since workers in these related comparative disciplines are not beset with any noticeable methodological despair, we too have reason to be optimistic. It also follows that we could gain much by familiarizing ourselves with the methodological innovations and safeguards employed in these other comparative areas. Many of the proposed solutions to problems of data comparability as approached in cross-cultural research (cf. Eckensberger, 1973, pp. 46-61), for example, are appropriate to life-span assessment applications.

Major advances in life-span assessment design and related statistical analyses (points b and c above) have recently been discussed by Baltes and Nesselroade (1973). In the present context, the availability of these improved techniques in conjunction with the fact that many Piagetian task formats have a most obvious face validity (at least when compared with many intelligence test items commonly employed in life-span research) is reason for genuine optimism. This will be particularly true if the reservations concerning the application of parametric statistical techniques (e.g., the linear additivity assumptions of parametric ANOVA models) to behavioral domains derived from organismic theory prove to be groundless (see Overton & Reese, 1973).

In our initial attempts to conduct Piagetian research in a life-span framework, it is probably advisable to confine our endeavors to those task formats which have undergone thorough preliminary analysis with the original age-appropriate samples. The understanding of classificatory relationships as assessed in the class inclusion task, for example, has been extensively and intensively investigated, and the determinants of successful performance are reasonably clear-cut (e.g., Brainerd & Kaszor, in press; Klahr & Wallace, 1972); its relationship to other Piagetian tasks has been demonstrated (e.g., Brainerd, 1973a; Hooper, Sipple, Goldman, & Swinton, in press); and the influence of instructional programming on criterial performance has been studied (e.g., Beilin, 1961b; Klausmeier & Hooper, in press). In the employment of class inclusion tasks (or any tasks, for that matter) in a life-span assessment design, it is extremely important to provide comparable motivational attractiveness and appropriate instructional sets for <u>all</u> the age subsamples under examination. In discussing memory research paradigms, Meacham has stated:

> If the child does not have an adequate understanding of the problem, then it should come as no surprise that the child does not engage in activities appropriate to solution of the problem . . . (and further). . . . Obviously the question of whether adequate performance at this task is dependent upon comprehension of the end-state or is simply dependent upon heightened motivation must be carefully considered, but it can at least be suggested that experimenters often do not exact optimal performance from their younger subjects [Meacham, 1972, pp. 211-212].

Similar admonitions for researchers using class inclusion tasks have been engagingly suggested by Hayes (1972), and I would maintain that these caveats are equally relevant to assessment research with elderly persons. We simply cannot assume that since the fundamental task requirements are self-evident to us (as task designers or task administrators) they are equally obvious to any individual "fortunate" enough to be drawn into our subject sample.

By way of conclusion, let us presume that we do indeed possess all the methodological armament essential to conducting life-span analyses of Piagetian conceptual abilities. Even if we had a series of absolutely equivalent tasks, an infallible assessment research design and associated analytic techniques, and a "normal" subject who was willing to have us follow and observe his activities from birth onward--there would still be something missing. I contend that there is something over and above a methodological sophistication, a penchant for model building, and ready access to subjects at widely disparate age levels which is the crucial defining criterion for a true life-span developmental investigator. Acceptance of the life-span orientation demands an awareness of certain process/product distinctions as potentially present throughout all our investigations. At the general level this implies that we discard the traditional notions that all developmental phenomena from birth to adulthood are necessarily progressive in nature and that all the interesting changes during the aging years are primarily decremental in nature. More specifically, it means that we must recognize that the <u>same</u> absolute performance levels (quantitative and qualitative criteria) for differing age groups may be mediated by different process mechanism (Turiel, 1969; Wapner, 1969; Werner, 1937) or may involve multiple distinctive problem-solving strategies or learning skills, only some of which are age-

specific (Goulet, 1973), or that differential environmental conditions and related concurrent factors may be operative.[7] The same reservations, of course, may apply to observed performance differences across age groups. In cautioning against a premature reliance upon biological factors as the major determinants of intellectual functioning in the aged, Baltes and Labouvie have stated:

> Consider, for example, that the age-graded nature of the educational system deemphasizes formal training in efficient information processing and complex problem solving in the aged. Moreover, consider that age differences in a given study might not only reflect the effect of age-specific deprivation or enrichment that differentiates older and younger subjects but also the differential distance from the time of formal schooling (compare e.g., the often reported age-decrement functions with retention curves). Further, note that the measurement instruments used when comparing age groups may not at all adequately sample the universe of task conditions that define the maintenance systems for the elderly. Finally, recognize that environmental differentials combine both ontogenetic (individual) and generational (historical) change components. Indeed, the overpowering effect of cohort differences found in recent studies (e.g., Schaie, 1970) assigns high probability to the conclusion that cross-sectional age decrements in cognitive functioning are less indicative of biological aging phenomena than of changes in cultural input systems [Baltes & Labouvie, 1973, p. 197].

The possibility that differential processes may be involved in supposedly congruent focal task performances may be briefly illustrated. A number of recent theorists have posited a close relationship between Piagetian task performances and memory factors as represented in information processing approaches (cf. Klahr & Wallace, 1970; Neimark, 1970; Pascual-Leone & Smith, 1969). Many of the Piagetian task formats such as transitive inference and conservation have a memory requirement as an essential component. In discussing the possible interactive role of memory and operational factors, Piaget has stated that "the most likely hypothesis is that the memory code itself depends on the subject's operations, and therefore this code is modified during development, and depends at any given moment on the subject's operational level [Piaget, 1968, p. 2]."

Tentative support for memory variables as partial determinants of young children's success on Piagetian concept tasks has been offered (Roodin & Gruen, 1970), and the development of memory strategies appears to parallel the growth of operational thought (Meacham, 1972; Neimark, Slotnick, & Ulrich, 1971). In contrast to these findings with children, memory ability disturbances do not appear to be closely linked to the operational deficits observed in the elderly (e.g., Ajuriaguerra, Kluser, Velghe, & Tissot, 1965; Ajuriaguerra, Richard, Rodriguez, & Tissot, 1966). Thus, the possibility exists that the concept task performance pattern similarities shown in comparisons of young children and the elderly are not based on identical process mechanisms.

It is obvious that life-span assessments which involve an emphasis upon process distinctions such as these require multiple measurement settings. But, in reality, it requires more than just sophisticated measurement strategies with closely matched analytic procedures; it requires adherence to a world view which openly tolerates intraindividual and interindividual differences and which accepts multiple causation of developmental phenomena as a logical and natural outcome. This emphasis on an appreciation of individuality highlights the fact that we are, in the final analysis, concerned with people; thus a fundamental humanistic philosophy is essential. We must not attempt to impose our particular form of adult

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[7] In addition to these reservations, it should be remembered that "pure" stage X responses are seldom observed by Piagetian researchers. While there is no question that major qualitative distinctions are evident when data are viewed from a macro-level, a mixture of stage responses for any given individual is frequently the case (cf. Flavell, 1971). A combination of distinctive stage-specific response categories or problem solution strategies appears to be typical of transitional phase children (e.g., Turiel, 1969, pp. 113-126), and adults in artificially contrived or stress-producing situations (e.g., Werner, 1957, pp. 140-146) and has been observed in elderly persons (e.g., verbal justifications associated with a lower genetic level may accompany higher level solutions and vice versa; Ajuriaguerra, Boehme, Richard, Sinclair, & Tissot, 1967, p. 437).

logic upon the preschool child, or the resident of the old age home, or the member of another "different" subculture. Normative behavior from the life-span perspective must forever be a relative term.

As you no doubt have surmised, I feel that the organismic world view ideally meets these requirements. I shall even contend that anyone who openly accepts my criteria for a viable life-span developmental discipline is, implicitly at least, accepting the organismic world view of Werner and Piaget. In a pervious paper (Hooper, 1973), I have claimed that an investigator's world view or basic philosophy of man is the primary determinant of what he expects to find as he examines life-span phenomena, effectively constrains what behavioral alterations he will designate as developmental in nature, and to a great extent, determines the methodological strategies he employs. From this position, there is no possibility of acquiring so-called "pure" objective data concerning life-span functioning. Any empirical observations are a product of the psychologist-observer's theoretical predispositions and his complex interactions with the system undergoing examination. As K. E. Boulding has stated: "All scientists are participant-observers in their own systems. . . . Hence the system changes as it is studied and <u>because</u> it is studied. There can be no myth of an unchanging universe with the scientist acquiring abstract knowledge about it [Boulding, 1967, as quoted in Riegel, 1973a, p. 16]." The two most commonly discussed contrasting world views are, of course, the organismic and the behaviorist (Looft, 1973; Reese & Overton, 1970). While acceptance of the organismic approach may not guarantee that the quest for nontrivial qualitative change will find an empirical resolution, this acceptance at least acknowledges the question of qualitative change as an issue worthy of research and subsequent theory development. Few of our behaviorist colleagues would make that statement.

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